

CLAIMS

1. An aluminum-based extruded neutron absorber comprising a body portion consisting of an aluminum alloy containing boron or a boron compound including isotopes having the ability to absorb neutrons at a boron content of 20-40% by mass; and a surface layer portion covering said body portion, consisting of an aluminum alloy whose boron content is 1% by mass or less; the aluminum alloy of said body portion being obtained from a mixed powder of boron or a boron compound with an average particle size in the range of 3-30 μm and an aluminum alloy powder with an average particle size in the range of 20-500 μm
2. A neutron absorber in accordance with claim 1, wherein said surface layer portion is at least 0.1 mm thick.
3. A neutron absorber in accordance with either claim 1 or 2, wherein said neutron absorber is plate-shaped, and the thickness of the surface layer portion on the sides of the plate is greater than the thickness of the surface layer portion on the top and bottom of the plate.
4. A neutron absorber in accordance with any one of claims 1-3, wherein the aluminum alloy of said body portion further comprises at least one element chosen from the group consisting of silicon, magnesium, iron, copper, manganese, chromium, titanium, nickel, vanadium, cobalt, molybdenum, niobium, zirconium, strontium and zinc, in addition to said boron or boron compound.
5. A neutron absorber in accordance with any one of claims 1-4, wherein the aluminum alloy of said surface layer portion further comprises at least one element chosen from the group consisting of silicon, magnesium, iron, copper, manganese,

chromium, titanium, nickel, vanadium, cobalt, molybdenum, niobium, zirconium, strontium and zinc.

6. A neutron absorber in accordance with any one of claims 1-5, wherein the boron content of said surface layer portion is 100 ppm or less.

7. A neutron absorber in accordance with any one of claims 1-6, wherein said boron compound is B₄C.

8. A neutron absorber obtained by rolling a neutron absorber in accordance with any one of claims 1-7.

9. A basket for accommodating spent nuclear fuel, wherein wall portions forming a space for accommodating said nuclear fuel is formed from an aluminum-based neutron absorber in accordance with any one of claims 1-8.

10. A method of producing an aluminum-based neutron absorber containing boron or a boron compound including isotopes having the ability to absorb neutrons, comprising:

(a) a step of preparing an aluminum alloy material whose boron content is 1% by mass or less;

(b) a step of mixing a powder of said boron or boron compound having an average particle size in the range of 3-30 μm with an aluminum alloy powder having an average particle size in the range of 20-500 μm such as to make the boron content 20-40% by mass to produce a boron-aluminum mixed powder; and

(c) a step of extruding said aluminum alloy material and said boron-aluminum mixed powder to form an aluminum-based neutron absorber comprising a body portion consisting of boron-aluminum and a surface layer portion of aluminum alloy covering said

body portion.

11. A production method in accordance with claim 10, wherein said aluminum alloy material is an aluminum alloy container, and said step (c) is a step of filling said aluminum alloy container with said boron-aluminum powder to form a preliminary compact, then extruding said preliminary compact to form an aluminum-based neutron absorber.

12. A production method in accordance with claim 10, wherein said step (c) comprises:

a step of cold isostatic pressing or cold pressing said boron-aluminum mixed powder to form a pressed compact; and

a step of arranging said aluminum alloy material and said boron-aluminum powder compact in order in the direction of extrusion, and extruding.

13. A production method in accordance with any one of claims 10-12, further comprising (d) a step of rolling the extruded aluminum-based neutron absorber.